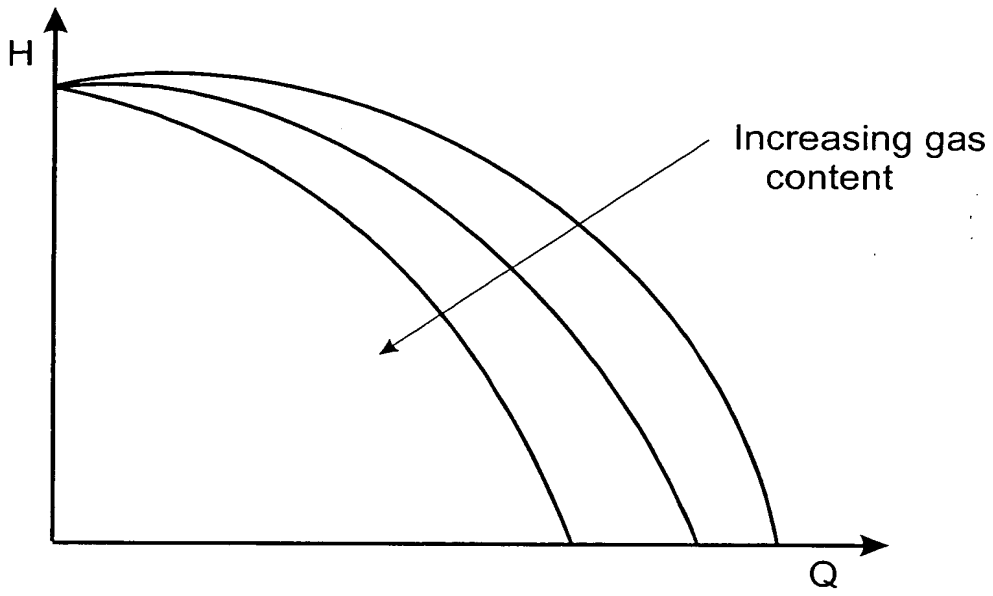


FIGURE 1

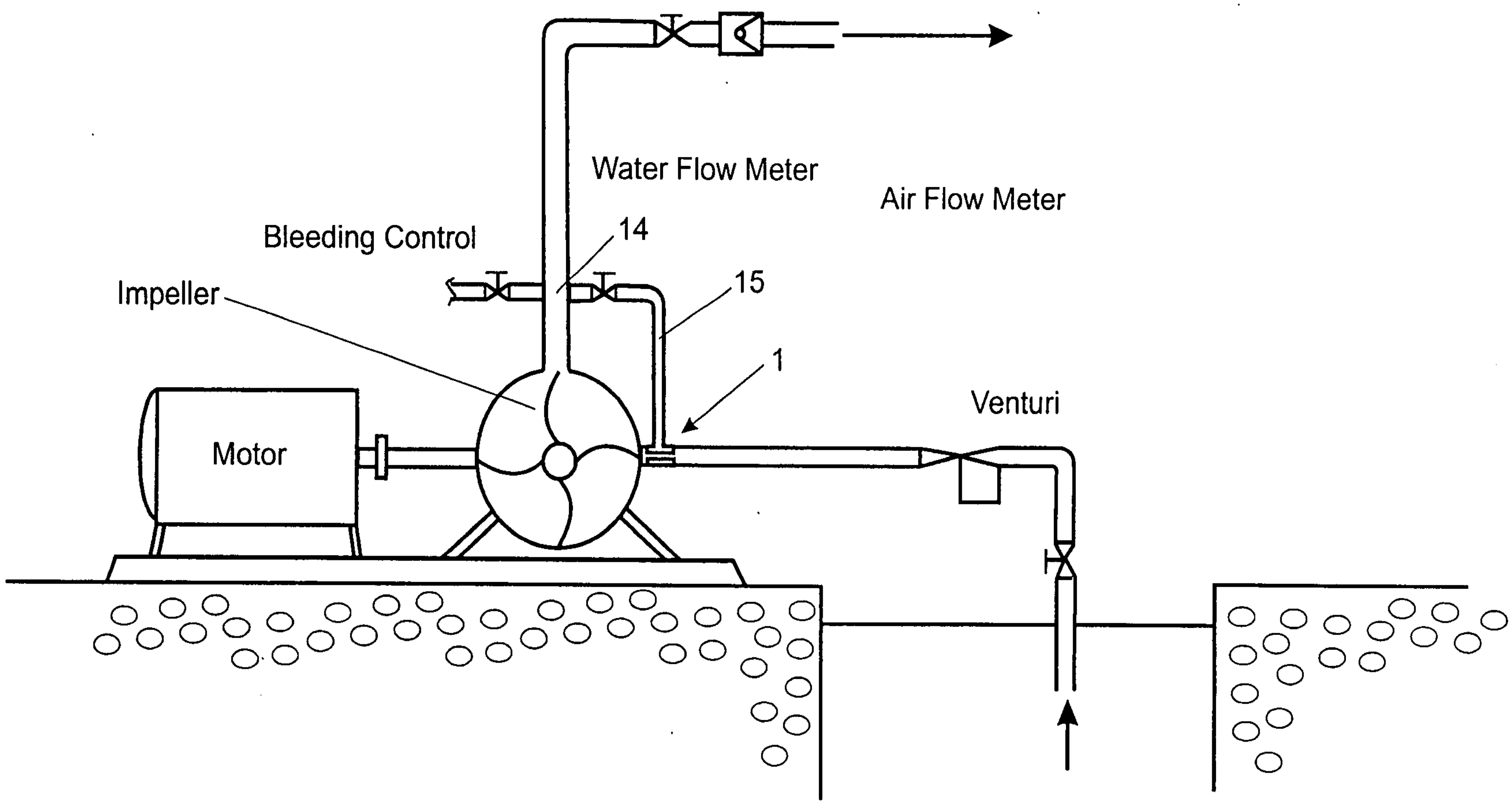


FIGURE 2

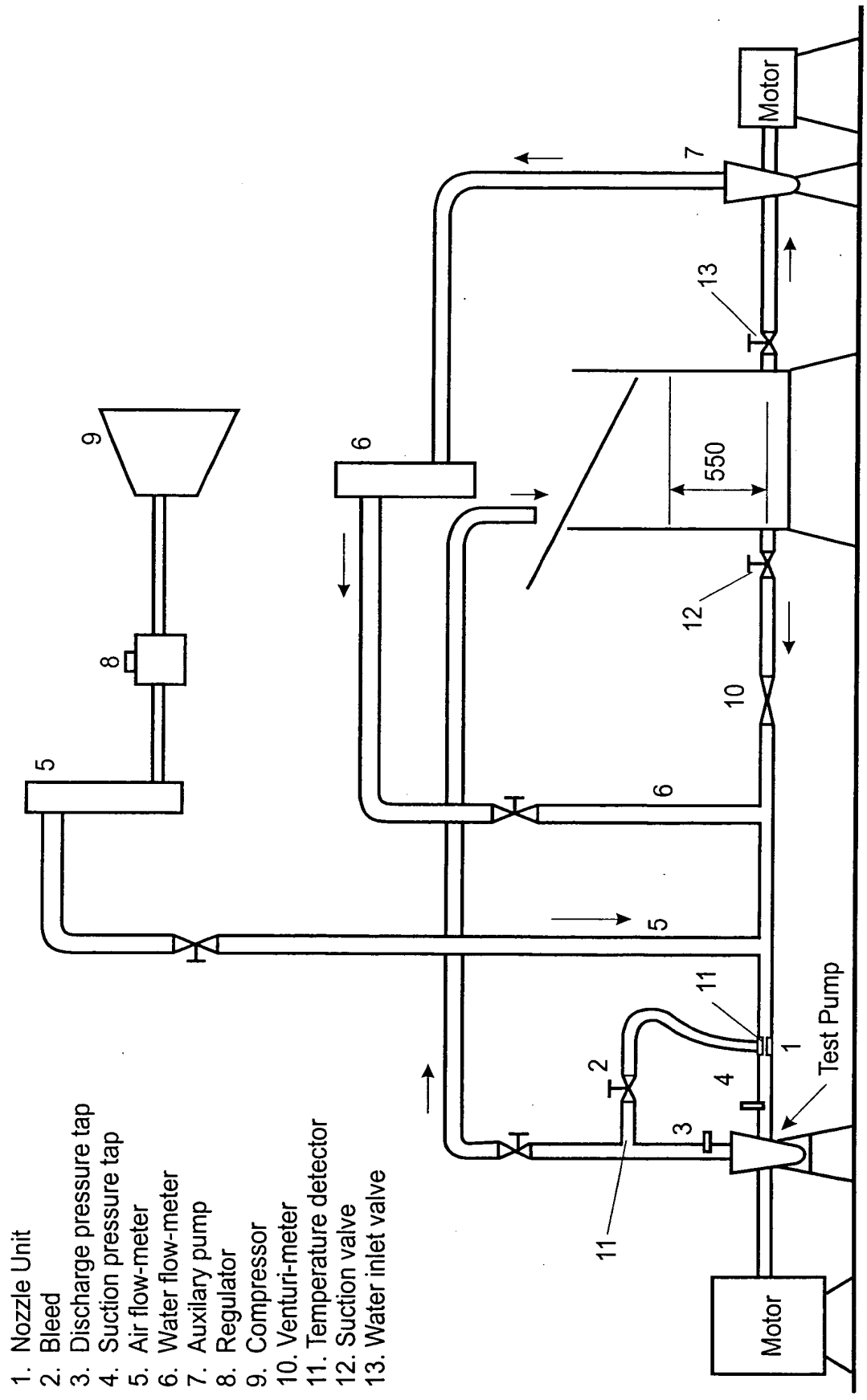

1. Nozzle Unit
2. Bleed
3. Discharge pressure tap
4. Suction pressure tap
5. Air flow-meter
6. Water flow-meter
7. Auxilary pump
8. Regulator
9. Compressor
10. Venturi-meter
11. Temperature detector
12. Suction valve
13. Water inlet valve
Motor
Motor
Test Pump
550

FIGURE 3

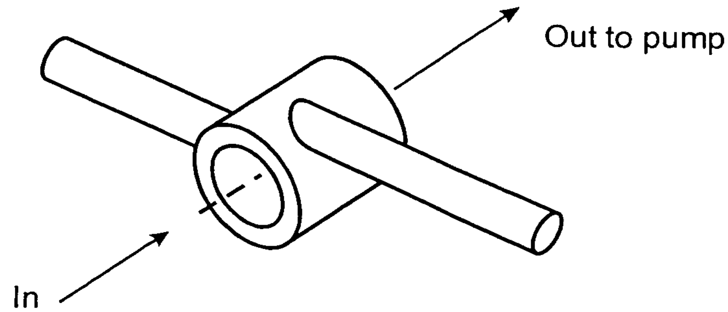


FIGURE 4

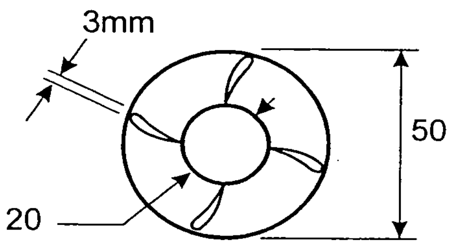


FIGURE 5

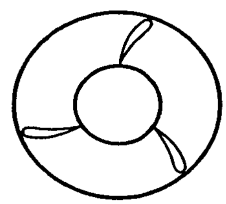


FIGURE 6

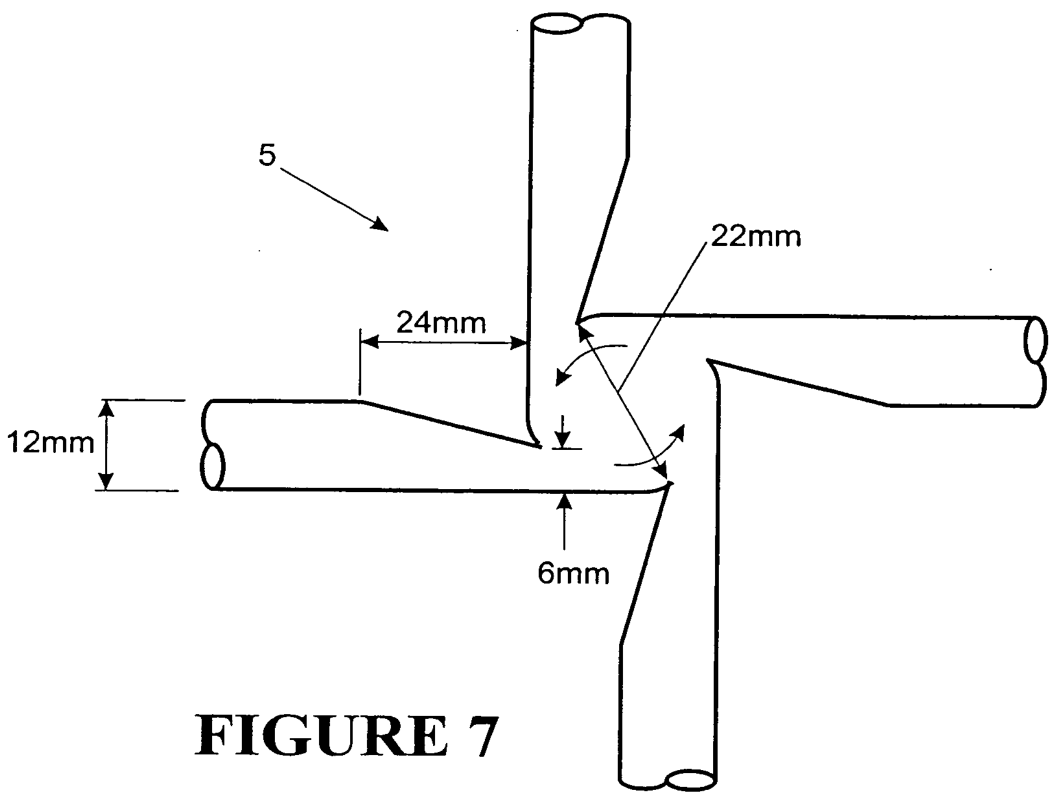


FIGURE 7

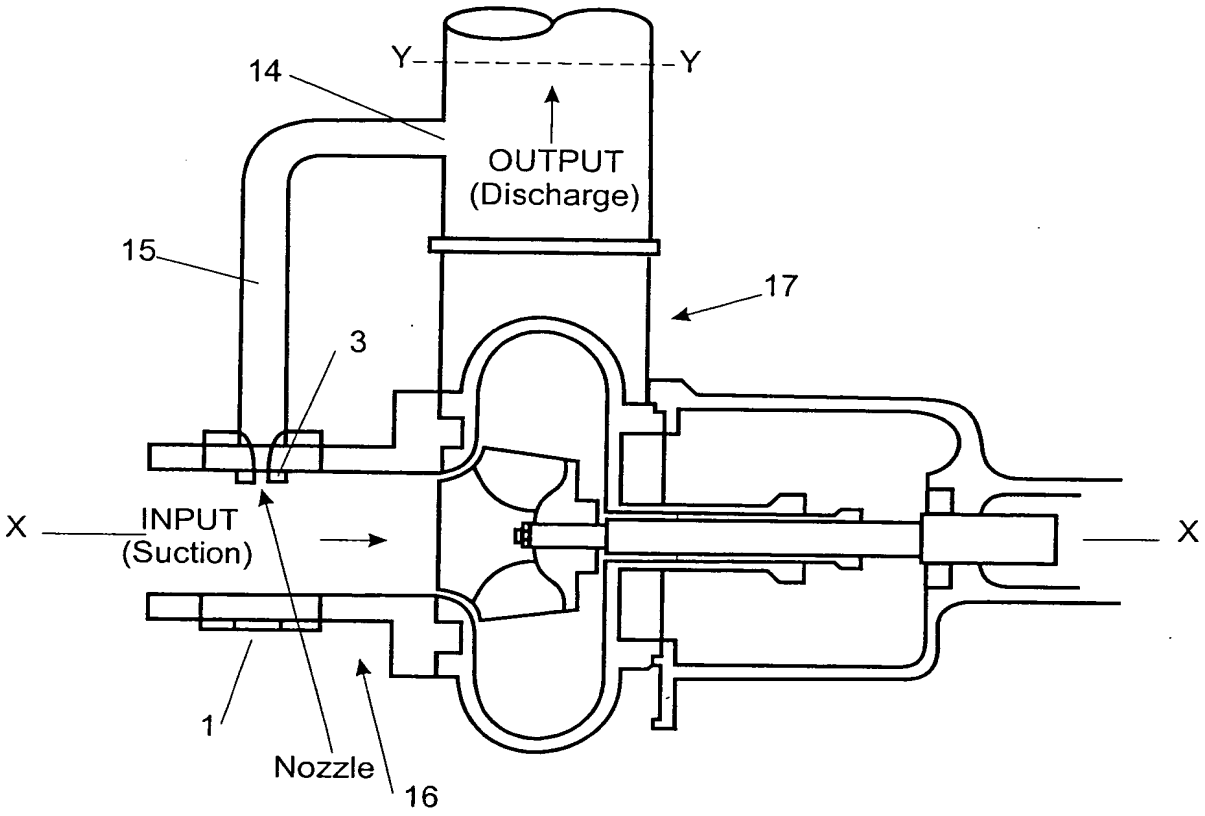


FIGURE 8

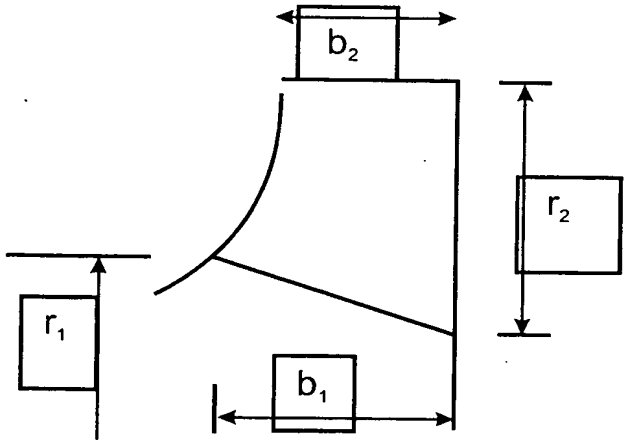
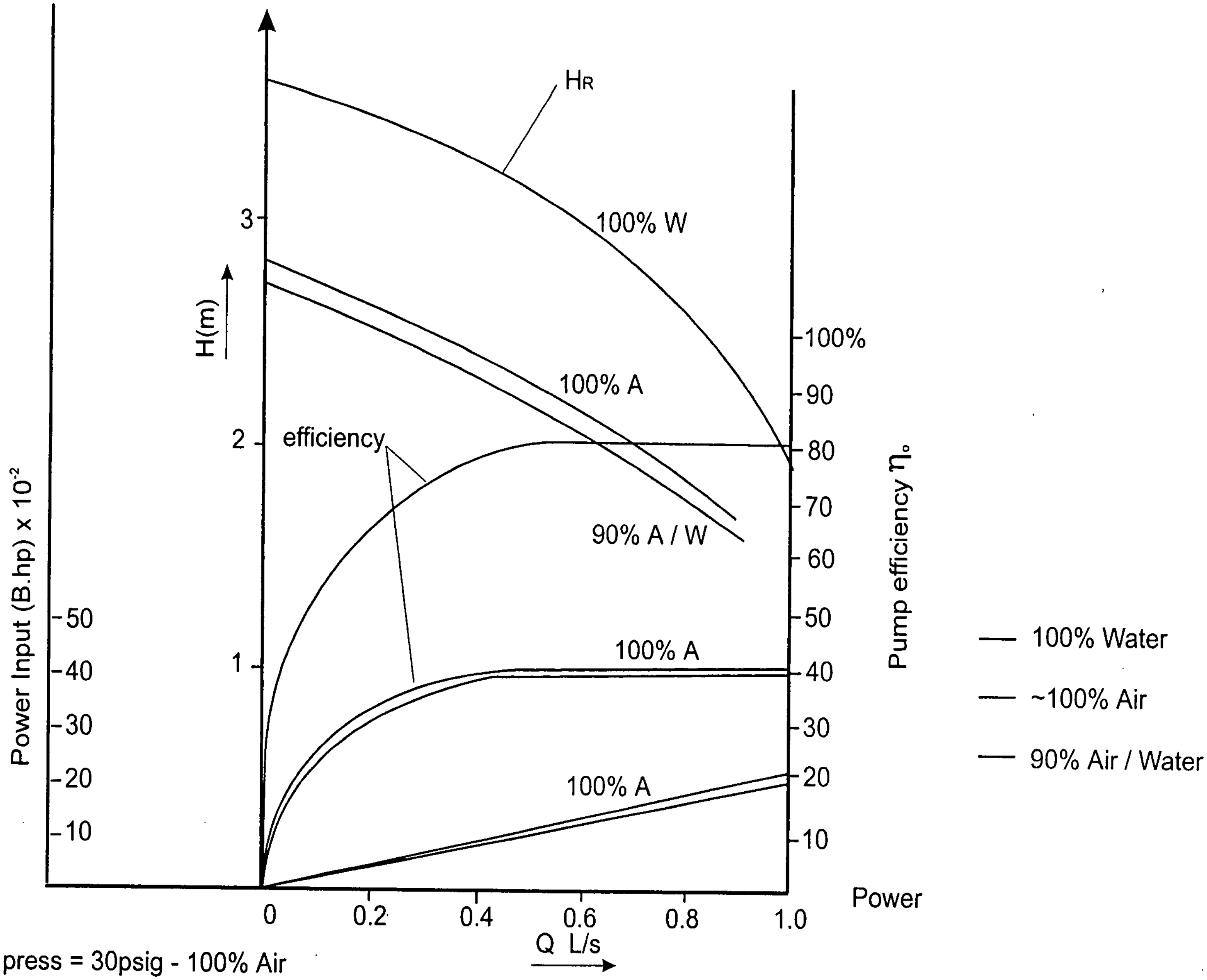


FIGURE 9

	100% Water				3 Vane Impeller: Air/Water Mixture - Intake air pressure 30psig																			
					10%				20%				30%				40%				50%			
Q(L/s)	1	0.9	0.84	0	0.83	0.41	0.21	0	0.83	0.41	0.21	0	0.83	0.41	0.21	0	0.83	0.41	0.21	0	0.83	0.41	0.21	0
H(m)	1.9	2.3	2.5	3.6	2.3	2.6	2.9	3.1	2.2	2.5	2.8	3.2	2.1	2.5	2.6	3.1	2	2.4	2.7	3.1	1.8	2.5	2.6	3
η_0 (%)	75	82	83	0	75	43	24	0	72	40	23	0	69	40	23	0	65	39	22	0	59	40	22	0
Bhp (kW)	0.18	0.2	0.2	0	0.18	0.1	0.06	0	0.18	0.1	0.06	0	0.17	0.1	0.06	0	0.16	0.1	0.05	0	0.14	0.1	0.05	0

	3 Vane Impeller: Air/Water Mixture - Intake air pressure 30psig																			
	60%				70%				80%				90%				100%			
Q(L/s)	0.83	0.41	0.21	0	0.83	0.41	0.21	0	0.83	0.41	0.21	0	0.83	0.41	0.21	0	0.83	0.41	0.21	0
H(m)	2	2.4	2.7	3	1.9	2.3	2.5	2.9	1.9	2.3	2.5	2.7	1.85	2.3	2.4	2.7	1.9	2.3	2.4	2.8
η_0 (%)	65	39	22	0	62	37	21	0	62	37	21	0	61	37	20	0	62	37	20	0
Bhp (kW)	0.16	0.09	0.05	0	0.15	0.09	0.05	0	0.15	0.09	0.05	0	0.15	0.09	0.05	0	0.15	0.09	0.05	0

FIGURE 10



Pump A - 3 vanes
S.H = 550mm - Air press = 30psig - 100% Air

FIGURE 11

	100% Water				4 Vane Impeller: Air/Water Mixture - Intake air pressure 30psig																			
					10%				20%				30%				40%				50%			
Q(L/s)	1	0.98	0.92	0	0.83	0.41	0.21	0	0.83	0.41	0.21	0	0.83	0.41	0.21	0	0.83	0.41	0.21	0	0.83	0.41	0.21	0
H(m)	1.6	1.78	2.1	3.34	2.1	2.2	2.9	3	2.2	2.4	2.9	3.1	2.1	2.3	2.7	3	1.9	2.3	2.8	3.1	2.1	2.4	2.9	3.1
η_0 (%)	63	63	76	0	69	36	24	0	72	39	24	0	69	37	22	0	62	37	23	0	69	39	24	0
Bhp (kW)	0.15	0.15	0.18	0	1.7	0.09	0.06	0	0.18	0.09	0.06	0.17	0.17	0.09	0.05	0	0.15	0.09	0.06	0	0.17	0.09	0.06	0

	4 Vane Impeller: Air/Water Mixture - Intake air pressure 30psig																			
	60%				70%				80%				90%				100%			
Q(L/s)	0.83	0.41	0.21	0	0.83	0.41	0.21	0	0.83	0.41	0.21	0	0.83	0.41	0.21	0	0.83	0.41	0.21	0
H(m)	2	2.3	2.7	3.2	1.9	2.3	2.7	2.9	1.95	2.3	2.8	3	1.9	2.4	2.7	3.2	1.9	2.5	3	3.1
η_0 (%)	65	37	22	0	62	37	22	0	64	37	23	0	62	39	22	0	62	40	25	0
Bhp (kW)	0.16	0.09	0.05	0	0.15	0.09	0.05	0	0.16	0.09	0.06	0	0.15	0.09	0.05	0	0.15	0.1	0.06	0

FIGURE 12

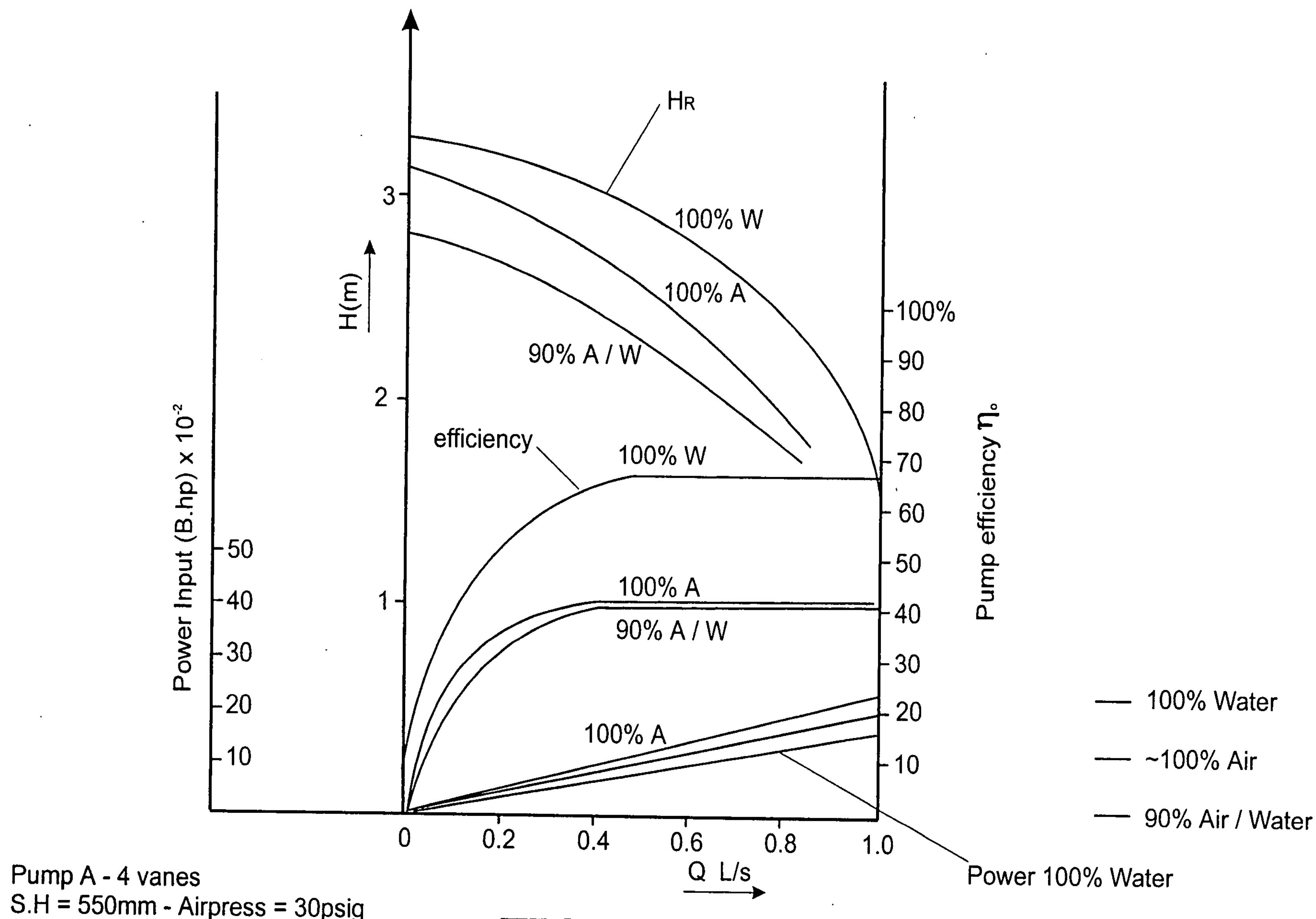

HR
100% W
100% A
90% A / W
efficiency
100% W
100% A
90% A / W
100% A
H(m)
3
2
1
Power Input (B.hp) x 10^{-2}
50
40
30
20
10
Pump efficiency η_o
100%
90
80
70
60
50
40
30
20
10
0
0.2
0.4
0.6
0.8
1.0
Q L/s
— 100% Water
— ~100% Air
— 90% Air / Water
Power 100% Water
Pump A - 4 vanes
S.H = 550mm - Airpress = 30psig

FIGURE 13

$H_2\phi/H_R$	4-vane	3-vane
0.11	0.9	0.92
0.25	0.95	0.88
0.43	0.9	0.84
0.67	0.83	0.8
1	0.9	0.72
1.5	0.87	0.8
2.3	0.83	0.76
4	0.85	0.76
9	0.83	0.74
50	0.83	0.72

FIGURE 14

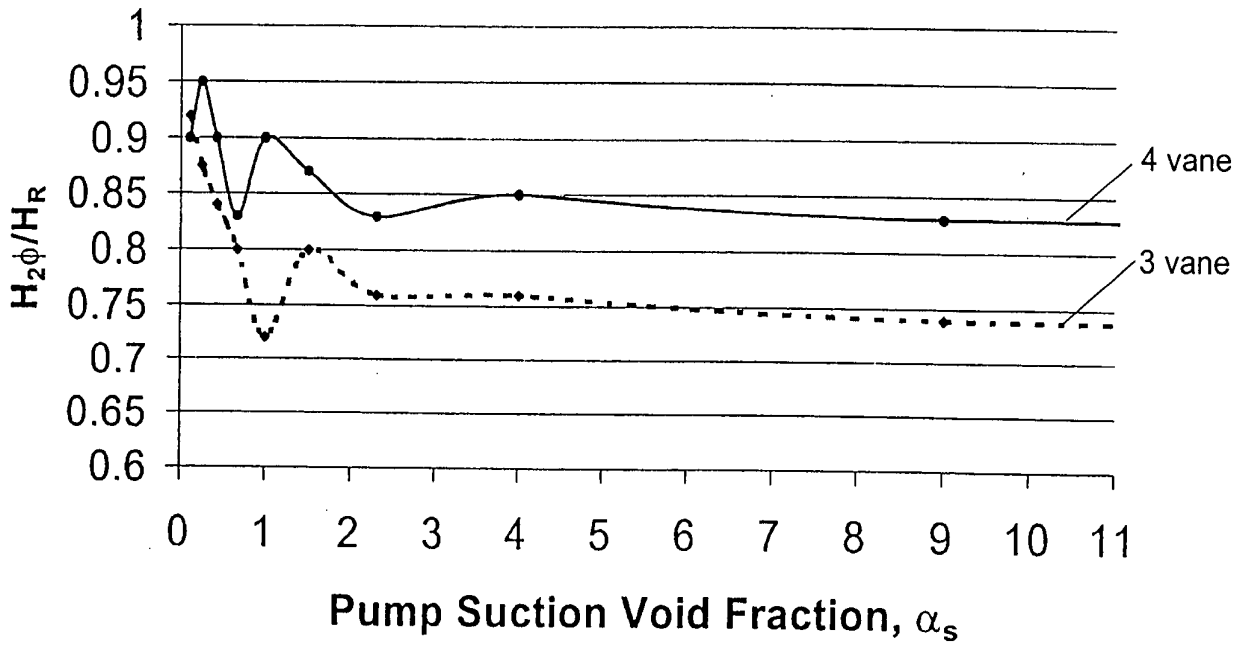


FIGURE 15